

HOW I DO IT

Radiofrequency Ablation of Metastatic Liver Tumor

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INTRODUCTION

Every year in the United States, 150,000 new cases of colon and rectal cancer are reported; at least 20,000 of these patients will develop hepatic metastases. The current treatment of choice for localized liver metastasis is resection. Other treatment alternatives include systemic chemotherapy, intrahepatic infusion, cryoablation, and chemoembolic hepatic artery occlusion.

Radiofrequency ablation (RFA) was first popularized in 1928 by Cushing [1], to remove intracranial tumors with minimal bleeding. Subsequently, RFA gained acceptance for cutting tissue and fulguration. Recent modifications of the original technique have led to more widespread application and increased acceptance in many specialties. RFA uses high-frequency, alternating current, which flows from an uninsulated electrode tip into the surrounding tissue [2]. The presumed mechanism of injury is heating of the tissue, resulting in coagulative necrosis. The advantages of this procedure include modulation of the electric waveform and a more precise area over which the energy is applied.

This focal ablative technique has several advantages over surgical resection in the treatment of liver metastases. Most importantly, it allows for selective thermal destruction with increased sparing of normal liver tissue. RFA is minimally invasive and affordable, with low morbidity.

CASE REPORT

A 50-year-old man with a history of smoking and drug abuse presented with a 5-day history of epigastric pain and vomiting. Abdominal computed tomography revealed a mass in the ascending colon, resulting in a partial small bowel obstruction and 1 large liver metastasis deep in the right lobe with extension into the medial aspect of the left lobe (Figs. 1, 2). Colonoscopic biopsy showed adenocarcinoma of the colon. The patient underwent a right hemicolectomy and radioablation of the liver metastasis.

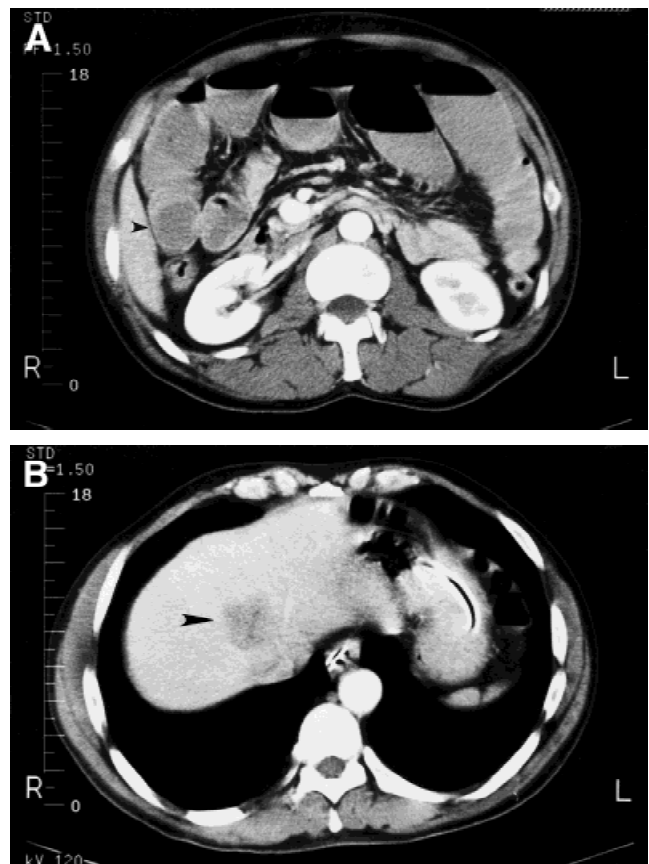


Fig. 1. **A:** Computed tomographic (CT) scan with evidence of small bowel obstruction and a mass in the ascending colon. **B:** CT scan showing metastatic tumor in the liver.

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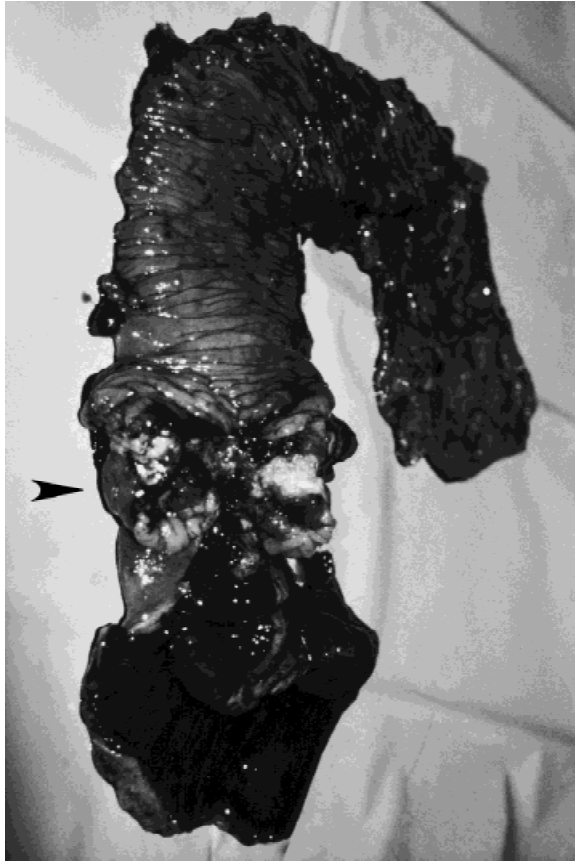


Fig. 2. Specimen with ascending colon mass.

His postoperative course was uneventful, and he was discharged home.

TECHNIQUE OF RFA

After the abdomen was explored and the right hemicolectomy completed, an intraoperative ultrasound was performed to localize the liver lesion (Fig. 3). The mass was biopsied and the diagnosis of metastatic adenocarcinoma confirmed by frozen section. Using ultrasound guidance, a disposable 25-cm-long, stainless steel, insulated probe with 7 retractable curved electrodes in its tip was introduced into the mass (RITA Medical Systems, Mountain View, CA). Once the probe was in the correct

Figure 3A. Radio frequency ablation

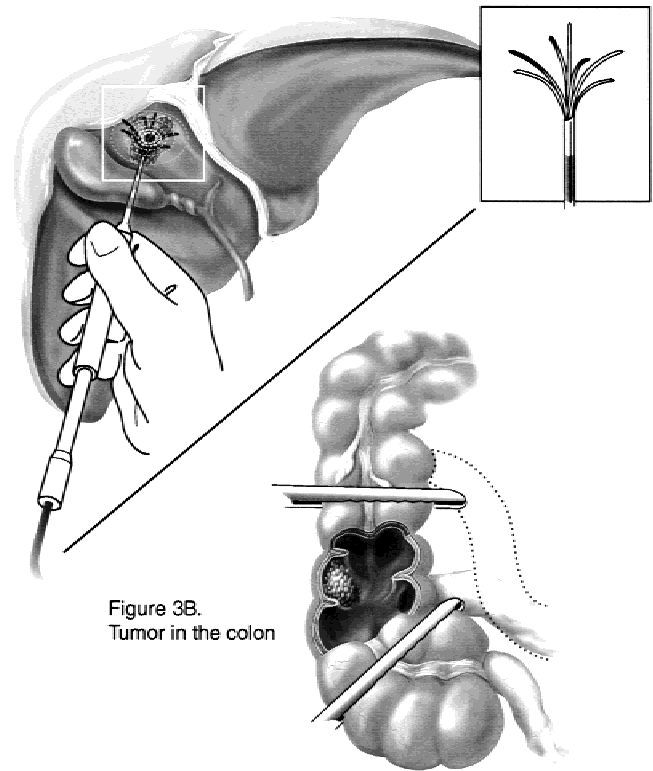


Figure 3B.
Tumor in the colon

Fig. 3. **A:** Introduction of the radiofrequency ablation probe. **B:** Tumor in the ascending colon. (Illustrations are by Anne Erickson, CMI.)

position, the hooks were deployed with a switch at the proximal end of the probe shaft. The power was started at 450 mHz with 50 W, which produced a temperature of 100°C, and this was maintained for 12 min. The area of desiccated tissue was examined by ultrasound, and the prongs were retracted. The probe was then connected to cautery through the same generator. The electrode was slowly removed as the tract was cauterized to prevent bleeding.

REFERENCES

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2. Patterson EJ, Scudamore CH, Buczkowski AK, et al: Radiofrequency ablation in surgery. In "Surgical Technology International VI. Surgical Overview." 1997:69-75.